

[0013] U.S. Pat. No. 4,680,577, issued on Jul. 14, 1987 to David H. Straayer et al., describes a multipurpose keyswitch for controlling cursor movement on a CRT display and for character entry. Straayer et al. do not suggest a cluster key arrangement according to the claimed invention.

[0014] U.S. Pat. No. 4,687,200, issued on Aug. 18, 1987 to Ichiro Shirai, describes a multi-directional switch in which on-off operation of multiple contacts is dependent on the pressing directions of the switch. Shirai does not suggest a cluster key arrangement according to the claimed invention.

[0015] U.S. Pat. No. 4,891,777, issued on Jan. 2, 1990 to James M. Lapeyre, describes a keyboard for use by one hand and adapted for entry of a large number of selections including those for alphanumeric data processing and a large range of computer operation commands. Lapeyre does not suggest a cluster key arrangement according to the claimed invention.

[0016] U.S. Pat. No. 4,918,264, issued on Apr. 17, 1990 to Masato Yamamoto et al., describes a switching device capable of returning to the neutral position of the operating member or centering itself by the resilience of a rubber switch. Yamamoto et al. do not suggest a cluster key arrangement according to the claimed invention.

[0017] U.S. Pat. No. 5,057,657, issued on Oct. 15, 1991 to Vedran Skulic, describes a low profile keyboard switch, having tactile and/or audible attributes for use in combination with a digitally operable, membrane switch array. Skulic does not suggest a cluster key arrangement according to the claimed invention.

[0018] U.S. Pat. No. 5,227,594, issued on Jul. 13, 1993 to Louis G. Russo, describes an electrical switch assembly. Russo does not suggest a cluster key arrangement according to the claimed invention.

[0019] U.S. Pat. No. 5,253,940, issued on Oct. 19, 1993 to Max Abecassis, describes a method to arrive at a single standard for numeric keypad layouts that provides consumers the means to set for themselves a single numeric keypad standard, and in this manner lead to the abandonment of layouts inconsistent with the layout incorporated on telephone devices. Abecassis does not suggest a cluster key arrangement according to the claimed invention.

[0020] U.S. Pat. No. 5,339,358, issued on Aug. 16, 1994 to Adel Danish et al., describes a data terminal enabling a user to easily input alphabetical, as well as numerical characters, into a telephone for input to a computer which in turn accesses a service provider computer. Danish et al. do not suggest a cluster key arrangement according to the claimed invention.

[0021] U.S. Pat. No. 5,378,862, issued on Jan. 3, 1995 to Hideo Tasaka et al., describes a switch which provides different switching inputs by pushing different operating portions of a single operating button. Tasaka et al. do not suggest a cluster key arrangement according to the claimed invention.

[0022] U.S. Pat. No. 5,386,091, issued on Jan. 31, 1995 to Kevin F. Clancy, describes a low profile keyswitch for use with a computer keyboard, calculator and other electronic machines that process data and information. Clancy does not suggest a cluster key arrangement according to the claimed invention.

[0023] U.S. Pat. No. 5,396,030, issued on Mar. 7, 1995 to Hiroshi Matsumiya et al., describes a control-key mechanism. Matsumiya et al. do not suggest a cluster key arrangement according to the claimed invention.

[0024] U.S. Pat. No. 5,430,262, issued on Jul. 4, 1995 to Hiroshi Matsui et al., describes a combination push switch device comprising a single push button with at least two push members which can independently operate at least two switch elements. Matsui et al. do not suggest a cluster key arrangement according to the claimed invention.

[0025] U.S. Pat. No. 5,612,690, issued on Mar. 18, 1997 to David Levy, describes a compact keypad system in which each function may be actuated comfortably by an adult-sized human finger. The key pad electronics are designed to register simultaneously actuated keycaps at an interstice as an input uniquely associated with the symbol located at the interstice. This distinguishes over the present invention because in the present invention a single character is generated in a mutually exclusive manner depending upon which specific key of a cluster key is depressed. Levy does not suggest a cluster key arrangement according to the claimed invention.

[0026] U.S. Pat. No. 5,631,453, issued on May 20, 1997 to Takuya Maeda, describes a multi-way flipping switch in which a movable contact can be reliably brought into contact with a stationary contact to thereby attain a stable contact state, and is capable of preventing two or more pairs of switching elements from being simultaneously turned on while securing the requisites waterproofness for the contact section. Maeda does not suggest a cluster key arrangement according to the claimed invention.

[0027] U.S. Pat. No. 5,666,113, issued on Sep. 9, 1997 to James D. Logan, describes a system which automatically switches use of a touch sensitive computer input touchpad between the functions of cursor control and keypad emulation. Logan does not suggest a cluster key arrangement according to the claimed invention.

[0028] U.S. Pat. No. 5,758,295, issued on May 26, 1998 to Bjorn Ahlberg et al., describes a single mode mobile cellular telephone with a man-machine interface which is the same for all cellular telephone systems. Ahlberg et al. do not suggest a cluster key arrangement according to the claimed invention.

[0029] U.S. Pat. No. 5,818,437, issued on Oct. 6, 1998 to Dale L. Grover et al., describes a highly efficient reduced keyboard which is used in conjunction with a display. The keyboard has twelve keys, nine of them labeled with numerous letters and other symbols, and those nine plus one more are labeled with one of the ten digits. Textural entry keystrokes are ambiguous. The user strikes a delimiting "select" key at the end of each wordy delimiting a keystroke sequence which could match any of many words with the same number of letters. The keystroke sequence is processed with a complete dictionary, and words which match the sequence of keystrokes are presented to the user in order of decreasing frequency of use. The user selects the desired word. The letters are assigned to the keys in a non-sequential order which reduces chances of ambiguities. The present invention generates a single character in a mutually exclusive manner depending upon which specific key of a cluster key is depressed. Grover et al. do not suggest a cluster key arrangement according to the claimed invention.